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Divest Oregon

Risky Business

Oregon Treasury's Fossil Fuel Problem

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ECUMENICAL MINISTRIES of OREGON

OREGON PSR PHYSICIANS FOR SOCIAL RESPONSIBILITY

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Summary

From heat domes to droughts, from coastal dead zones offshore to vanishing snowmelt and groundwater, climate change has already arrived in Oregon with widespread and devastating effect.[1] Oregonians are worried. A series of short stories compiled by the Oregon League of Conservation Voters depicts the new reality of scorched trees, a snowless Mount Hood, and the disappearance of insects, birds and animals from the state's famous landscapes.[2] Those Oregonians navigating rising houselessness, the state's legacy of white supremacy, and rural poverty are bearing the brunt of climate change with the most vulnerability and the fewest resources to cope with this new reality.[3]

Burning oil, gas, and coal is the main cause of climate change.[4] When they are burned, these non-renewable fossil fuels release greenhouse gases like carbon dioxide and methane into the air, causing the planet to heat up and creating unprecedented and increasingly dangerous weather events. Fossil fuel companies — which drill or mine for non-renewable energy sources, refine them for use as fuel, or burn them for electricity — have contributed more than any other sector to global climate chaos.[5]

Now, thanks to major shifts in cost and technology, the world is moving away from fossil fuels toward clean energy at an accelerated pace. There are now more than 1,500 institutions publicly committed to at least some form of fossil fuel divestment, representing an enormous $40 trillion of assets under management.[6] Investors left holding stock in fossil fuel companies will find their holdings becoming riskier, or even worthless, over time.[7]

Rather than championing this necessary and massive shift in the energy sector, the Oregon State Treasury has at least $5.3 billion invested in climate-wrecking fossil fuel companies with over $1 billion invested in the coal industry alone.

OST's investments in fossil fuel companies are probably much higher than $5.3 billion. A quarter of the funds managed by OST are invested – by contracted managers, not by OST staff – in private equity funds.[8]

How those outside managers invest this money is kept from public disclosure by state law,[9] but many private equity funds are heavily invested in fossil fuels.[10] In general, funds with significant fossil fuel investments have provided lower returns over the past decade than funds without.[11, 12] An evaluation of OST's fossil fuel investments over the past decade conservatively estimates that they underperformed compared with a fossil fuel free alternative by **at least $4 billion.** Despite the risks of future long-term underperformance, the OST continues to make **new** investments in the volatile fossil fuel industry and refuses to commit to a phased divestment plan.

The writing is on the wall. It is past time for the OST to follow the emerging norm of fossil fuel divestment,[13] already initiated by smaller bodies across the state, and to reinvest in Oregon's fossil-free future.

This report details the investments in fossil fuels made by OST that are known to the public, and outlines how continued support of the fossil fuel industry by the state exposes Oregonians to climate and health risks, economic costs, and financial losses.

Recommendations

In light of the risks posed by fossil fuels, and the associated loss on investments, the Oregon State Treasury (OST) should:

1. **Stop all new investments in fossil fuels.** They pose a financial, health, and climate risk to Oregonians.

2. **Annually release a public list of all portfolio holdings in every asset class.** The Oregon Treasury must meet transparency standards regarding its investment strategy.

3. **Phase out all current fossil fuel holdings and move to climate-safe investments,** using a social justice framework that accounts for climate impacts on frontline communities across the state, including rural communities and communities of color.

OREGON'S FOSSIL FUEL HOLDINGS: SCOPE AND RISK

The Scope of the Investment

The Oregon State Treasury (OST) has at least $5.3 billion invested in fossil fuel companies (see Figure 1).[14] Fossil fuel companies drill or mine for non-renewable energy sources (such as oil, gas, and coal), refine them for use as fuel, or burn them for electricity. $5.3 billion is $500 million more than the federal budget for energy efficiency and renewable energy in 2022![15]

The Oregon State Treasury (OST) and the Oregon Investment Council (OIC) oversee the investment and allocation of all State of Oregon trust funds. Divest Oregon obtained information on OST investments through a public records request submitted to OST in August 2021. OST produced the information in December 2021. This $5.3 billion is 4.6% of the $116 billion invested in the combined assets of the Public Employee Retirement Fund ($90 billion) and the Short Term Fund ($27 billion) as of June 30, 2021.[16]

Except for real estate, all of the "asset classes" – investment groupings – in the Public Employee Retirement System (PERS) contain fossil fuel investments (see Figure 2). Remarkably, the Oregon Short Term Fund (ORSTF), which includes all excess state agency cash and cash invested by local governments, contains almost $1 billion in fossil fuel investments.

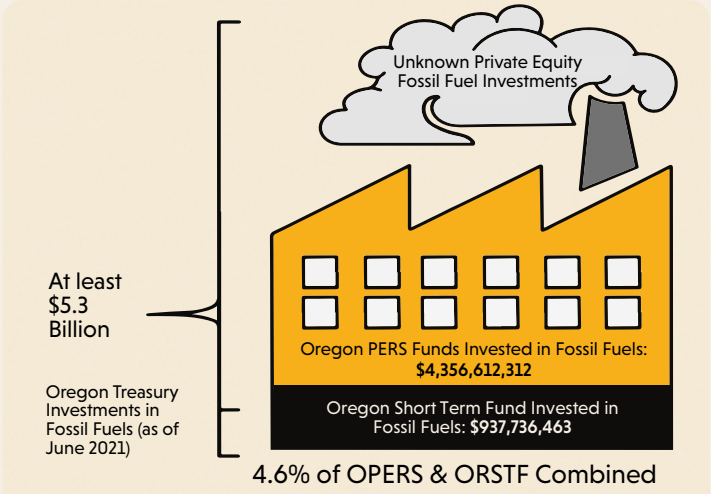


Figure 1: Fossil Fuel investments by the Oregon State Treasury as of June 30, 2021[17]

The full scope of OST's fossil fuel exposure is unclear. Noticeably absent in the response to the public records request is specific holdings information on OST's private equity holdings.

At the end of February 2022, OST had $25.7 billion invested in private equity firms[18] like Encap Energy Capital and KKR (see case study on KKR).[19] These private equity firms, with their focus on short-term profitability in distressed debt investments, are highly exposed to the relatively volatile fossil fuel sector.[20] OST's fossil fuel investments, therefore, likely greatly exceed $5.3 billion.

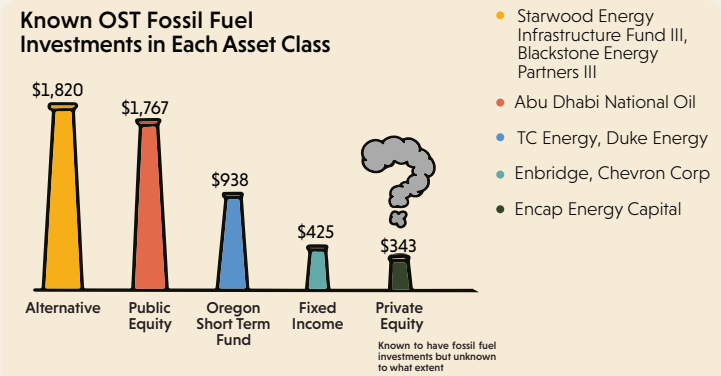


Figure 2: Known OST investments (in millions) in fossil fuels by asset class (definitions in Appendix A) on June 30, 2021 with a sample of holdings for each asset class.[21]

OST's investments support companies actively expanding fossil fuel infrastructure, from tar sands and gas pipelines to fracking wells and offshore drilling – even digging new coal mines and building new coal-fired power plants (see Figure 3). They range from companies like American oil supermajors Chevron and ExxonMobil (see the case study on ExxonMobil) to energy infrastructure companies like Kinder Morgan.

OST also invests in banks, which are the primary financiers of fossil fuels. Analyzing those financial sector investments is outside the scope of this report; see the deep dive provided in the report *Banking on Climate Chaos 2022*. Institutional investment in fossil fuels also often occurs through passive investment in index funds, for example in New York.[22]

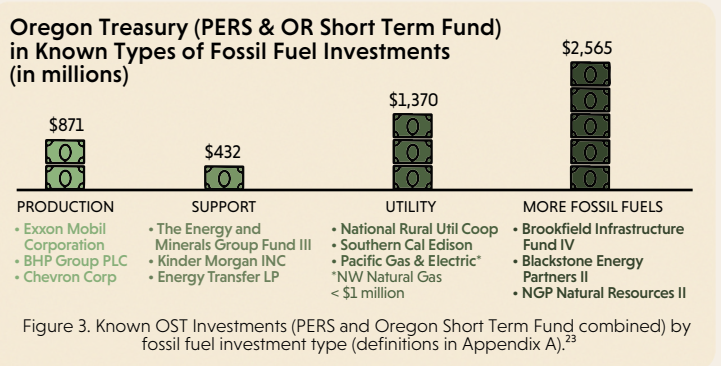


Figure 3. Known OST Investments (PERS and Oregon Short Term Fund combined) by fossil fuel investment type (definitions in Appendix A).[23]

ASSET CLASSES Asset Classes are groupings of investments that have similar characteristics and are subject to the same laws and regulations. *Check out Appendix A to learn more about each category.*

EXXON
case study

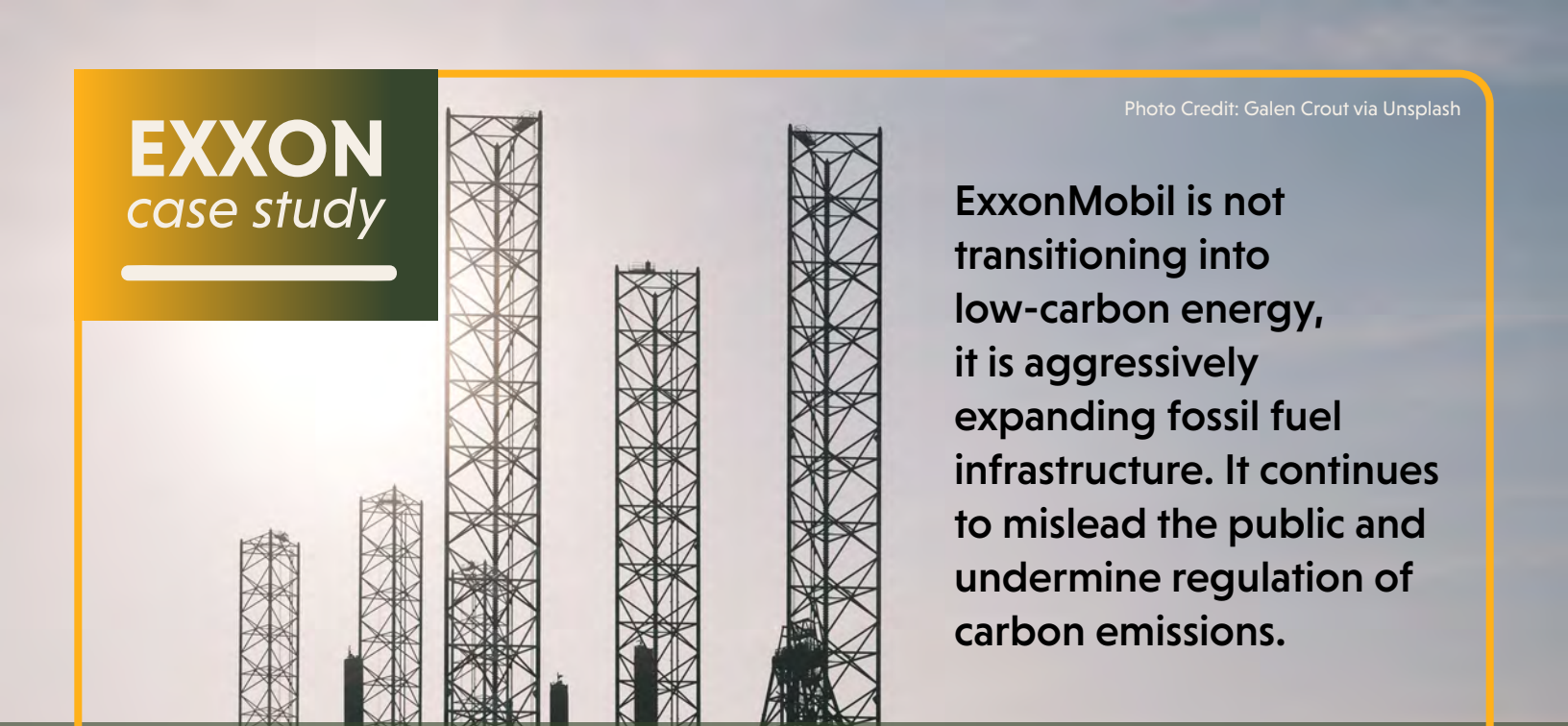


Photo Credit: Galen Crout via Unsplash

ExxonMobil is not transitioning into low-carbon energy, it is aggressively expanding fossil fuel infrastructure. It continues to mislead the public and undermine regulation of carbon emissions.

The Oregon State Treasurer has consistently cited voting the OST's shares of ExxonMobil during Annual General Meetings as an example of the usefulness of shareholder engagement and as justification for holding stocks in companies like ExxonMobil, rather than divesting.[24] ExxonMobil has been one of the top targets for climate-related shareholder votes for years, but these votes have not changed its behavior in any meaningful way.[25] See section on "Shareholder Engagement is Not Enough."

In its third quarter of 2021, ExxonMobil reported $10.8 billion in exploration expenses,[26] which will put ExxonMobil in the global top five expansionists of oil and gas exploration and production in the coming years.[27]

"'Investing in new fossil fuel infrastructure is moral and economic madness,' UN Secretary-General António Guterres said as the Intergovernmental Panel on Climate Change (IPCC) released part of its latest report[28] on [April 4, 2022]. This scientific summary, focused on how the world can cut greenhouse gas emissions, warns of the extraordinary harm to all of humanity caused by fossil fuels and the need for a rapid energy transition away from oil, gas, and coal, calling for changes over the next three years. 'Such investments will soon be stranded assets, a blot on the landscape, and a blight on investment portfolios.'"[29]

That same day, oil giant ExxonMobil made an announcement of its own:[30] a $10 billion final investment decision for an oil and gas development project in the South American nation of Guyana that the company said would allow it to add a quarter of a million barrels of oil a day to its production in 2025.[31] ExxonMobil is not transitioning into low-carbon energy, it is aggressively expanding fossil fuel infrastructure. It continues to mislead the public and undermine regulation of carbon emissions.

ExxonMobil has publicly downplayed the reality and seriousness of climate change known by its own scientists,[32, 33] as well as by supporting organizations such as the American Enterprise Institute and the American Legislative Exchange Council.[34] Oregon cannot trust ExxonMobil to make a good-faith effort to meaningfully reduce its climate impacts or transition to a clean energy company.

The investor community is noticing. Just one example: Nest and UBS Asset Management have divested from five energy companies, including ExxonMobil, due to their lack of engagement around climate change.[35]

Climate Risks of Fossil Fuels

The impact of fossil fuel companies on the climate is well-documented. In the past 30 years, just 100 of these fossil fuel companies – the "carbon majors" – have contributed more than 70% of global greenhouse gas emissions (largely, carbon dioxide and methane).[36] These emissions cause our planet to heat up and create unprecedented and increasingly dangerous weather events, such as the heat dome Oregonians experienced in the summer of 2021. **A 2019 United Nations Intergovernmental Panel on Climate Change (IPCC) report explains that there is only a short window of time to prevent even more catastrophic effects from climate change.[37]**

In addition to directly promoting emissions of greenhouse gases, some fossil fuel companies have followed the playbook of tobacco companies and actively sought to mislead the public and postpone regulation of carbon emissions. They do this both by publicly downplaying the reality and seriousness of climate change known by their own scientists,[38, 39] as well as by supporting think tanks and trade associations such as the American Enterprise Institute, the American Petroleum Institute, and the American Legislative Exchange Council (ALEC).[40]

Bloomberg editors on the *IPCC Report Climate Change 2022: Mitigation of Climate Change* wrote: "The world's leading climate finance experts and economists warned that **too much money continues to pour into fossil fuels and too little is channeled to clean energy**, putting the planet on track to blow past its limit to avoid catastrophic global warming. In its latest assessment of global efforts to contain climate change, published [April 4, 2022],[41] the United Nations Intergovernmental Panel on Climate Change issued a stark alert that the world is on track to warm by more than 3 degrees Celsius, twice the stretch goal of the Paris Agreement. **Finance is both driving the problem and a 'critical enabler' in the energy transition,** the panel said."[42]

The Fifth Oregon Climate Assessment, published by the Oregon Climate Change Research Institute, outlines a number of climate-related hazards across the state: an increase in the number of days warmer than 90°F, more frequent droughts, larger and more intense forest fires, and more flooding.[43] The incidence of severe weather, and particularly drought, can be attributed primarily to human-caused climate change, largely from the burning of fossil fuels.[44]

While all Oregonians will feel the impacts of climate change, not all will feel the impacts equally. The continued investment in fossil fuels poses a particular risk to poor communities and communities of color. These frontline communities face inequities in economic and political power, historical disinvestment, discriminatory practices and policies, structural racism, higher exposure to pollution,[45] and less access to health and wellness resources.[46] In this way, Oregonians navigating rising economic insecurity, houselessness, the state's legacy of white supremacy, and rural and urban poverty are bearing the brunt of climate change and have the fewest resources to cope with it.[47] This is the injustice of climate change and continued fossil fuel investment.

Burning fossil fuels creates increased health risks for everyone. Coal causes particularly acute health risks. Institutions in a divestment process typically divest from coal first for this reason.[48] While Oregon closed its last coal power plant in 2020, the OST is still funding the heavily-polluting coal industry (see the case study on coal).

Oregon should be among the leaders in the divestment arena, just as we are in clean energy legislation. It is imperative that Oregon take every opportunity to end its contribution to global climate degradation.

"As a pediatric nurse practitioner, I have seen the damage fossil fuels cause to children. In areas with high emissions from traffic, children have increased asthma rates and more severe cases of asthma than the general population. As a PERS member, I want to know that my retirement funds are not contributing to this harm to children."

MARILEE DEA, PEDIATRIC NURSE PRACTITIONER AND PERS MEMBER

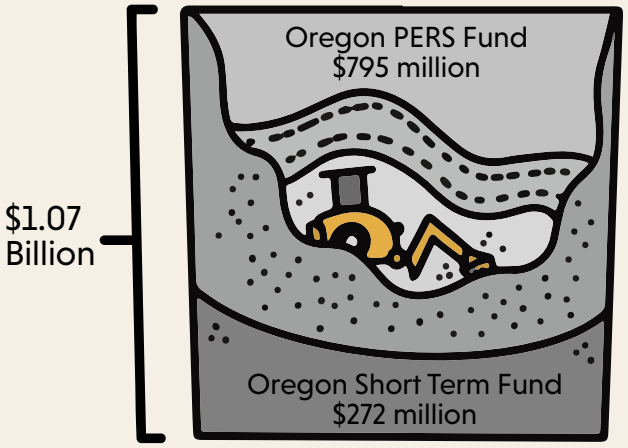
COAL
case study

The OST currently has at least $1.07 billion invested in the coal industry.[49] It is well documented that coal carries major environmental and health risks.[50] But is it a good investment?

Moody's 2021 analysis concludes that the coal industry's limited access to capital, loss of regulatory support, public opposition, health and safety risks, pollution contributions, and loss of employment base leaves it vulnerable to increasing pressure on investors to divest.[51]

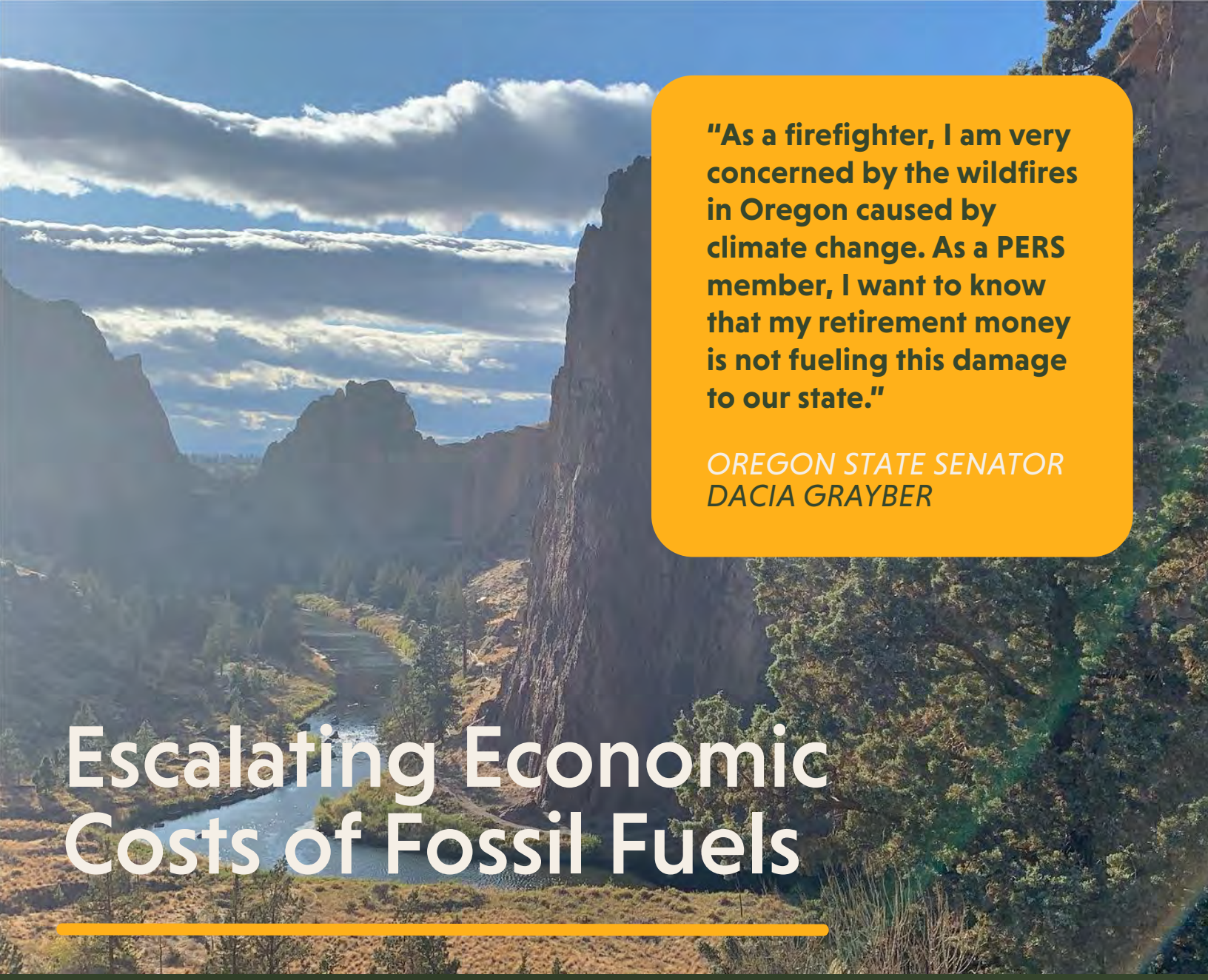
The producer of the Coal Exit List, NGO Urgewald, examined institutional investors' exposure to the coal industry based on their share and bond holdings in November 2021. "All in all, we identified institutional investments of over US$1.2 trillion in the coal industry," says Yann Louvel, policy analyst at Reclaim Finance.[52,53]

Known Investments in Coal
by the Oregon State Treasury



Lovell goes on to say, "It's absolutely frightening to see that pension funds, asset managers, mutual funds and other institutional investors are still betting on coal companies in the midst of an existential climate crisis."

It seems incongruous that we would still be investing in coal when Oregon prides itself on closing its last coal-fired power plant in 2020 because it was the largest single source of greenhouse gas emissions in Oregon.[54] If it's too dirty for Oregonians, why is it okay for anyone else?



"As a firefighter, I am very concerned by the wildfires in Oregon caused by climate change. As a PERS member, I want to know that my retirement money is not fueling this damage to our state."

OREGON STATE SENATOR DACIA GRAYBER

Escalating Economic Costs of Fossil Fuels

Investing in fossil fuels not only poses climate and health risks, it comes with economic costs. In the past twenty years, natural disasters in Oregon have risen 280% over the previous 20 years (1980 to 1999).[55] These disasters are not only more frequent, but also more powerful.[56] Forest fires and drought, which together constitute over 80% of the total cost of natural disasters in Oregon since 1980, are fueled by rising emissions.[57] It is estimated that $40 billion in annual earnings will be lost by mid-century due to exposure of outdoor workers to extreme heat.[58]

As natural disasters escalate in severity and scope, so do their economic costs. The past five years of natural disasters (2016 to 2021) have cost Oregon almost as much as the previous 35 years.[59] These costs match global trends: 2021 alone is responsible for 11.5% of the total cost of natural disasters over the past four decades.[60] Frontline communities, who are more likely to live in areas or have jobs that are more susceptible to climate change, are the most at risk of economic loss from natural disasters.[61]

Rural Oregonians have been hard-hit by drought and fire. Agriculture makes up 13% of the state's gross product.[62] Over 95% of farms and ranches are family owned and operated.[63] Droughts, fires, and aridity linked to climate change are devastating for both family farmers and the local economy in rural areas.

While OST's investments in fossil fuels are only a small portion of global investments in the fossil fuel sector, Oregon is failing to lead by example and only contributing to the costs of climate chaos.

Looking Back: Underperformance of Fossil Fuel Investments

Over the past decade, fossil fuel public equities have underperformed compared with whole-market indices.[64, 65] Consequently, market indices[66, 67] and ETFs[68] that exclude fossil fuels have outperformed the market as a whole (see Figure 4).[69] The energy sector's role in major indices is diminishing, to the extent that even ExxonMobil, a member of the Dow Jones since 1928, was removed from the Dow Jones in August 2020.[70]

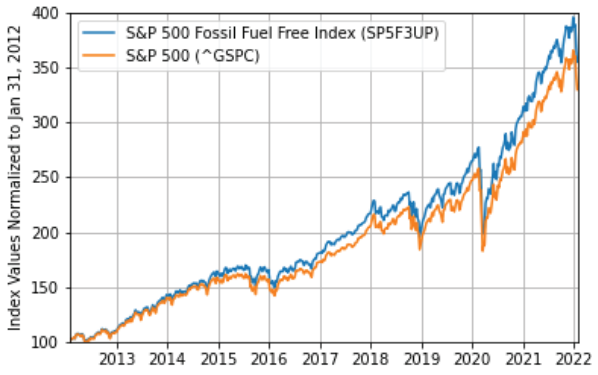


Figure 4: Fossil Fuel Free Index vs Total Market Index Values[71, 72]

Looking back at OST's investments over the same past decade, we estimate that OST's fossil fuel holdings underperformed in comparison to fossil fuel free indices by at least $4 billion. This $4 billion estimate is a low estimate of the underperformance because the analysis includes only some of the known fossil fuel holdings. (As pointed out earlier in this report, not all of OST's fossil fuel holdings are known.) This estimate assumes that the OST's 200 largest individual public equity fossil fuel holdings were held continuously between January 2012 and January 2022. The estimated January 2022 value of these holdings is compared against their value if they had been invested instead

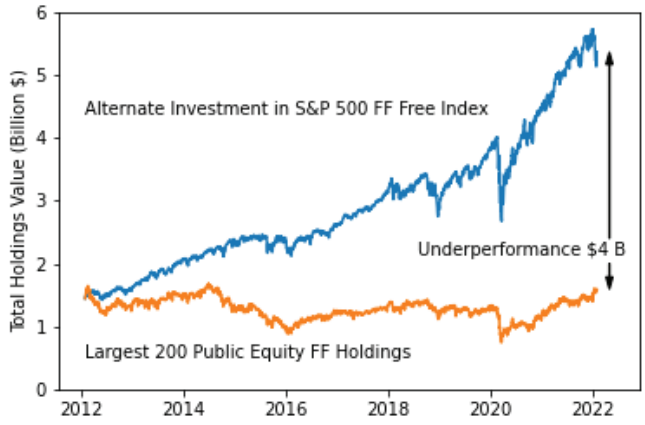


Figure 5: Estimate of underperformance of 200 largest public equity OST holdings (with available data) over the past decade as compared with S&P 500 Fossil Fuel Free Index (see Appendix B).

in the S&P 500 Fossil Fuel Free Index over the past decade (Figure 5). Details of this analysis can be found in Appendix B.

If we broaden the scope of the analysis to all OST holdings included in fossil fuel production, support, and utilities, then the potential underperformance rises from $4 billion to $10 billion. This alternate estimation method models historical behavior with an energy sector index instead of individual fund prices, so it could lead to a larger range of plausible underperformance estimates. See Appendix B for more details.

Russia's 2022 invasion of Ukraine has increased oil and gas prices, and has produced a short-term increase in the value in fossil fuel companies' stocks. This is a dubious basis for long-term investment decisions of a pension fund. There is strong and real financial incentive to divest from fossil fuels and reinvest in sustainable, less volatile alternatives that are not despoiling our state.

The market has shown what is otherwise self-evident: a polluting, climate-disrupting, volatile industry subject to uncontrollable political forces has no place in a contemporary investment portfolio.

"As other states and asset managers have realized, no notion of fiduciary duty requires asset managers to continue to invest in underperforming assets, particularly ones whose very existence is incompatible with a habitable planet. It is beyond time for the Oregon Investment Council to catch up and to take action to make Oregon divest from these toxic assets."

NATHAN KARMAN, PERS MEMBER

LOOKING FORWARD:
LONG TERM FINANCIAL LOSSES AND RISKS
FROM FOSSIL FUEL INVESTMENTS

Market Shift, Stranded Assets, and Geopolitical Risk

Continued investment in fossil fuels by OST and other institutional investors makes little financial sense. As the global economy shifts and renewable energy overtakes the fossil fuel industry, the fossil fuel sector is contracting, leaving questionable long-term gains for investors. While the historical risks of the fossil fuel industry – such as volatility and geopolitical disruption – remain, the risks of investment in the fossil fuel industry are increasingly dominated by climate impact. Climate change is driving market shifts and the resulting risk of stranded assets is increased by conflicts linked to climate change.

Holdings in fossil fuel companies face a large, unpredictable, and permanent drop when these companies' assets – such as pipelines or oil fields – become "stranded" or devalued to the point of becoming a liability for the company. The Inter-American Development Bank notes that "60 to 80% of publicly listed fossil fuel reserves must be considered 'unburnable' if the world is to avoid disastrous climate change, potentially costing the fossil fuel industry $28 trillion in revenues over the next two decades."[73] While the timeline is unpredictable, the likelihood of major stranded assets in the fossil fuel sector is almost inevitable, given policy and technological developments tied to the energy transition. Institutions holding on to investments with stranded assets will face a permanent decline in their holdings and returns.

Fossil fuel companies are more exposed to geopolitical risk than other economic sectors. The recent war in Ukraine, which is a conflict partially linked to control over natural resources, is just one example of how fossil fuel holdings can become worthless. OST lost millions in the Russian fossil fuel industry following war and sanctions.[74] In early March 2022, after ignoring months of warnings, the OST announced its intent to divest Russian assets, including the now-sanctioned major Russian oil company Gazprom,[75] but the OST is now unable to find a buyer.[76] Figure 6 shows what happened to share prices of Gazprom from June 30, 2021 through early April 2022.

Figure 6: Russian Gazprom PERS holding since June 30, 2021.[77]

It is not just Russian oil companies that are risky investments. OST also holds shares in fossil fuel companies like Chevron, which wrote off $10 billion in value in late 2019.[78] Chevron has a "severe risk" rating by Morningstar, a financial services firm that tracks companies' environmental, social, and governance (ESG) risks.[79] Other ESG risk ratings for some OST fossil fuel investments can be found in Table 1.

Table 1: Sampling of OST Fossil Fuel Holdings (as of June 30, 2021) with their ESG Ratings.

Company Name	Environmental, Social, Governance (ESG) Risk Rating by Morningstar	OST Holding Value in June 2021
ExxonMobil	High Risk[80]	$124,709,427
Freeport McMoran Inc.	High Risk[81]	$29,994,566
Chevron	Severe Risk[82]	$27,672,727
Pacific Gas & Electric	High Risk[83]	$10,646,637

What is Private Equity?

- Ownership shares in a company that are invested privately through a pooled fund.
- The shareholders of the private equity fund are either limited partners, such as Oregon State Treasury, or general partners, such as KKR.
- Limited partners have limited control over management of the fund. The general partner is largely responsible for executing and operating the investment.
- Private equity's portfolio companies are not bought or sold on a public stock exchange, and prices are not set by market forces.
- Private equity investments are made for years at a time. The rights of private equity shareholders are negotiated on a case-by-case basis. The specific relationship between the partners, and the limited partners' fees, are set by contract, often binding the parties for years.
- Disclosure to the OST, the Oregon Investment Council (OIC), and to the public is limited to the overall performance of an often-enormous fund, both by contract and by an Oregon state law exception to public records.[84] [85]

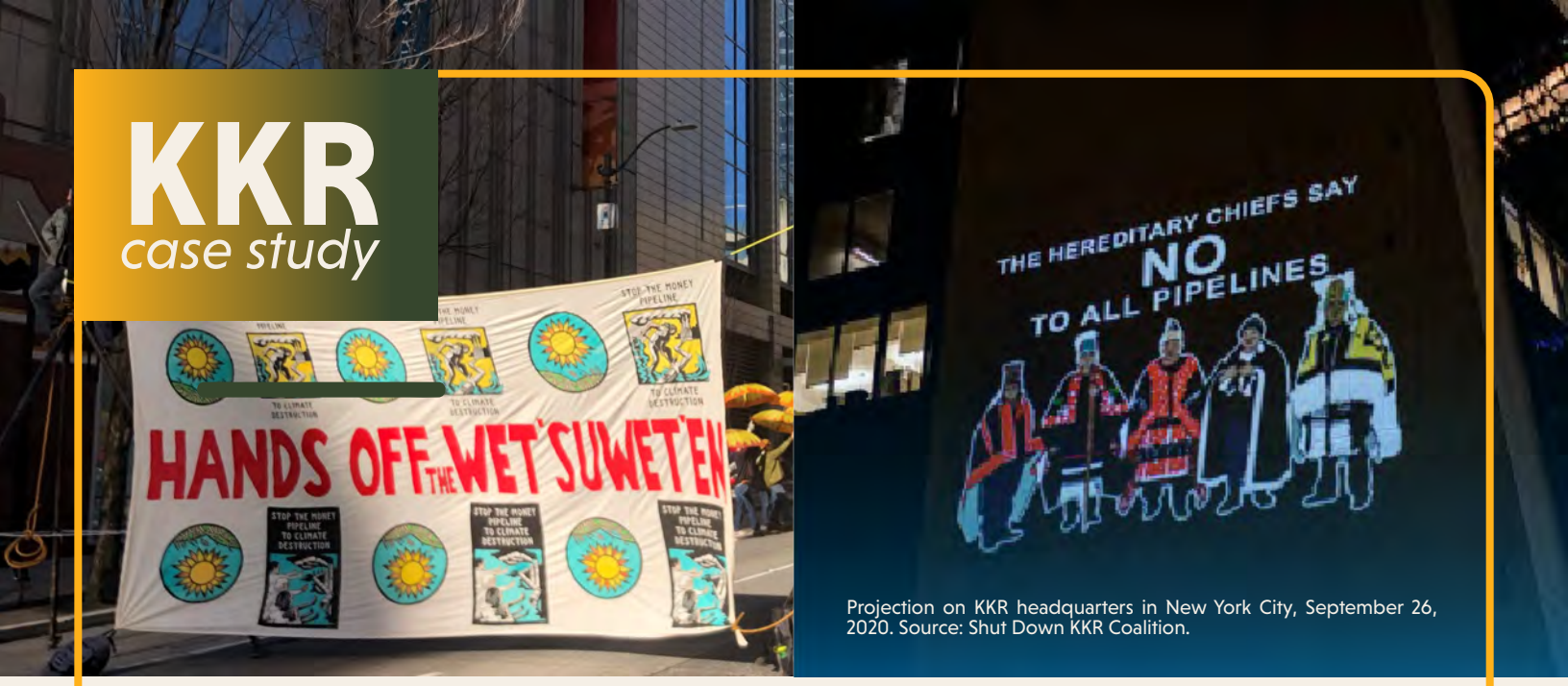
Additional Risks from Private Equity Investments

Because of OST's private equity investments, the full risk posed by fossil fuels to the state and to retirees is unknown.

Some private equity funds are propping up oil, chasing short-term profit in volatile markets. These secretive investment companies have pumped billions of dollars into fossil fuel projects, buying up offshore platforms, building new pipelines, and extending lifelines to coal power plants.[86] An October 2021 report by the Private Equity Stakeholder Project found that approximately 80% of energy investments held by ten of the largest private equity buyout firms are in oil, gas, and coal.[87] OST invests in six of these ten private equity firms (KKR, Blackstone, Warburg Pincus, Apollo, TPG, and CVC).[88] For more, see the case study focusing on private equity firm KKR, one of the largest private equity firms in the world and one in which OST is heavily invested.

Private equity investments are 26% of Oregon's PERS investment portfolio (see Figure 7),[89] well above the Oregon Investment Council's (OIC) stated target of 14% to 21%,[90] and create an overly large burden of risk to PERS returns.

KKR
case study



Projection on KKR headquarters in New York City, September 26, 2020. Source: Shut Down KKR Coalition.

The private equity investor KKR (formerly known as Kolhberg Kravis Roberts and Company) has $428 billion in assets under management.[91]

KKR currently owns around three dozen energy companies.[92] Around 82% of KKR's energy portfolio companies are in fossil fuels, with around 18% in renewable energy.[93]

In the Pacific Northwest, KKR acquired a significant stake in the Coastal GasLink Project,[94] which is being built to deliver fracked gas from British Columbia to a liquified natural gas export facility on the West Coast.[95] Wet'suwet'en hereditary chiefs' opposition to having the pipeline traverse their unceded territory has resulted in protests, delays and blockades; the pipeline is over budget and behind schedule.[96] In addition to OST's investment in KKR, OST also has invested directly in the Coastal GasLink parent company, TC Energy.[97,98] See Climate Safe Pension Network's report *Coastal GasLink*, noting other pension funds that have also invested in the pipeline.[99]

Also in the Pacific Northwest, after decade-long opposition,[100] Oregonians defeated a gas pipeline project proposed by Canadian pipeline company Pembina; it would have been Oregon's top carbon polluter.[101] The pipeline would have transported liquified natural gas through Oregon to Jordan Cove for markets in Asia.[102] In 2022, KKR created a joint venture with Pembina to boost Western Canada fossil fuel infrastructure.[103]

KKR is increasing fossil fuel investment as others abandon it.[104] Bloomberg noted that, "KKR [is] doubling down on investing in exploration and production companies as many in the sector seek to recover from years of poor returns amid the shale boom and bust."[105]

Just as KKR is aggressively committed to fossil fuel infrastructure expansion, the OST has increasing investment in KKR – and in private equity assets more broadly. In 2021, the OIC approved 16 new private equity commitments totaling $3.2 billion, including $275 million in additional investment in KKR.[106]

The fair market value of KKR private equity held by the OST as of June 30, 2021 was $2.2 billion.[107] Given KKR's exposure to the fossil fuel sector, a sizable amount of this $2.2 billion is likely invested in oil, gas, and coal ventures.

In the March 2022 OIC regular meeting, according to the OST's Senior Investment Officer in Portfolio Risk & Research, 49% of the predicted financial risk to PERS comes from its private equity investments.[108]

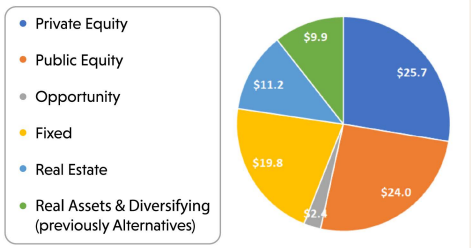


Figure 7: OST Holdings Amounts by Asset Class in PERS as of February 2022 (in billions)[109]

Private equity contracts are illiquid,[110] making it difficult for the OST to respond as the tide shifts to renewable energy – or even to make nimble investment shifts as needed for other reasons. The additional problem of significant reputational risks can arise when locked into an illiquid contract with outside managers. This is illustrated by the OST decision to contract with the private equity firm Novalpina; OST invested $232.9 million in Novalpina in 2017.[111, 112] In 2019, the Novalpina fund acquired a controlling stake in NSO Group, making OST the largest indirect investor in a spyware company.[113] Confronted about OST's investment, a spokesperson for the Treasurer said they supported the sanctioning of technology companies that "facilitate human rights violations and the oppression of journalists by selling technology to authoritarian regimes."[114] An OST spokesperson said: "Treasury is one of many limited partners in this fund; as a limited partner, we do not control the investment decisions made by external managers at private equity funds."[115] While Novalpina transferred management of the fund that owns NSO, in a decision "heavily influenced by [the Treasurer]",[116] OST was still a party to a contract with Novalpina at the end of September 2021.[117]

FOSSIL FUEL DIVESTMENT: A SOLUTION FOR OREGON

Fossil fuel divestment – reducing holdings in oil, gas, and coal companies – is the most immediate and effective solution for Oregon to address the climate risks, economic costs, and financial losses associated with OST's fossil fuel holdings.

Shareholder Engagement Is Not Enough

The OST has rejected fossil fuel divestment and touts shareholder engagement, particularly engagement with ExxonMobil, with the argument that OST keeps a "seat at the table" to pressure fossil fuel companies to alter their behavior.[118, 119] A phased divestment approach does not preclude OST from shareholder activism. While shareholder engagement is too little, too late to shift the fundamental structure of fossil fuel companies, divestment does not preclude shareholder engagement. In fact, investors that have adopted divestment policies tend to rank highly on shareholder voting, while some vocal critics of divestment are not as active on engagement.[120] While shareholder engagement by major asset managers like Vanguard or BlackRock may be the exception to the norm, research suggests shareholder activism has failed to transition the fossil fuel sector from its core business model of extracting, processing, and refining oil, gas, and coal.[121, 122]

Researchers at the University of Cambridge reviewed two decades' worth of research on shareholder engagement and concluded that it was an ineffective strategy for forcing the level of change needed at the pace needed in fossil fuel companies:

"Shareholder resolutions are indeed largely non-binding, and results in this quarter are poor regardless; most resolutions fail, and a majority of those that pass are withdrawn or fail to be implemented.... By any threshold one one could devise as to the efficacy of a tactic for action on climate change and other social and environmental issues, it would be difficult to deem shareholder engagement a success."[123]

For instance, ExxonMobil has been one of the top targets for climate-related shareholder votes for years, but has not changed its behavior in any meaningful way.[124]

Divestment Works
(According to Fossil Fuel Companies)

Fossil fuel divestment is an effective tactic for influencing future investment strategies. Divestment is a vote of "no confidence" in the fossil fuel sector that can decrease company valuation and raise the cost of financing future products (and therefore keep more fossil fuels in the ground).[125] Fossil fuel companies themselves have listed divestment as a top material risk to their bottom line. According to British oil major Shell:

> *...some groups are pressuring certain investors to divest their investments in fossil fuel companies. If this were to continue, it could have a material adverse effect on the price of our securities and our ability to access equity capital markets. The World Bank has also announced plans to stop financing upstream oil and gas projects in 2019. Similarly, according to press reports, other financial institutions also appear to be considering limiting their exposure to certain fossil fuel projects. Accordingly, our ability to use financing for future projects may be adversely impacted. This could also adversely impact our potential partners' ability to finance their portion of costs, either through equity or debt.*[126]

In sum, for an industry that relies on long-term financing of expensive extraction projects, fossil fuel divestment breaks with "business-as-usual" and can have a significant impact. The acknowledgement that the growing divestment movement may reduce fossil fuel stock prices presents an additional source of financial risk for those holding fossil fuel investments.

Divestment Aligns with Oregon's Climate Commitments

Leaders in Oregon say that climate change is real and should guide policymaking. A 2020 gubernatorial executive order requires greater use of clean energy technologies by state agencies and a public health investigation of the effects of climate change on tribes, communities of color, low income communities, rural communities, and youth mental health.[127, 128] Recent legislation, such as the 100% Clean Energy for All bill, exemplifies Oregon's climate commitment.[129]

Oregon is only the third state in the nation to set mandatory, enforceable limits on greenhouse gas emissions from fossil fuels.[130] Despite the direct contribution of fossil fuel companies to the problems the executive order and legislation are trying to address, OST's money remains invested in fossil fuels. The OST and the Oregon Investment Council should lead in Oregon and around the nation in eliminating OST's contribution to the climate crisis.

Divestment Makes Economic Sense for Oregon

Fossil fuel investments do not align with Oregon's political commitments, and they do not reflect the growth trajectory of the state's economy. Over half of all energy sector jobs in Oregon are in clean energy. Job growth in this area is outpacing economy-wide job growth by over 60%. Jobs in clean energy also pay, on average, 20% more than jobs in other industries.[131] Policies enacted since 2020 will add nearly 10,000 jobs and $2.5 billion to Oregon's GDP by 2050, but enacting more ambitious climate policies on top of these would increase that number to more than 18,000 new jobs and $4 billion in state GDP in 2050.[132]

The state should leverage its power as an investor to support job growth in industries that benefit Oregon's workers.

Transparency First

Transparency is key to functional, democratic governance. It is a major incentive for government to operate competently and serves as a safeguard to ensure it operates in the public interest, including when it comes to financial decision-making.

A major problem inevitably occurs when a public institution such as the OST invests in private equity. The problem arises because of a fundamental culture clash between the two partners. The OST is a limited partner with limited rights to control the investments, and a private equity manager is the general partner with the primary authority to make investment decisions.[133] In commenting on their spyware investment, OST chose to define their role starkly: "...as a limited partner, we do not control the investment decisions made by external managers at private equity funds"[134] and "...we do not participate in the selection, operation, or control of portfolio companies."[135] Private equity firms demand secrecy, as reflected in the Oregon Revised Statutes (ORS) 192.355.[136] Allowed disclosures about private equity investments by the Treasury are found in ORS 192.355(14)(b).[137] Essentially, public disclosure is limited to the overall performance of a fund. Evaluation of, or even knowledge about, specific investments within a fund remain confidential.

This means neither the public nor oversight bodies, such as the Oregon Investment Council (OIC), have full knowledge of private equity's holdings. $25.7 billion of OST's PERS investments[138] is shrouded in secrecy.

In support of good governance and fiduciary duty, Divest Oregon pursued one of its core demands through legislation in the 2022 session: a full accounting of OST's holdings.[139] Oregon state laws protecting private equity assets from disclosure[140] forced an amendment to the bill that maintained the secrecy of these investments. The OST spoke against even this amended bill.[141]

OST and OIC's lack of oversight on its specific private equity investments is inconsistent with their obligation as a fiduciary of public funds – particularly the 26% in PERS retirement funds of state employees. This secrecy is also inconsistent with a trustee's obligation to keep beneficiaries informed about important matters of trust administration,[142] including specific investments of the state's funds.[143] There is no way to measure and manage risks that are kept hidden.

In addition to illuminating OST's management of all funds in their care, transparency for the state's fossil fuel assets is a key component of divestment, revealing the degree of fossil fuel exposure, the possible path to divestment, and the actual pace of divestment.

Divestment: An Emerging Norm in Oregon and Globally

Over 1,500 investors with $40 trillion in assets have committed to increasing low-carbon and climate-safe investments.[144] Thus far, the amount of money divested is larger than the GDP of China and the United States combined.[145] Fossil fuel divestment is the largest divestment movement in the world and represents an emerging global investment norm. With continued investment in fossil fuels, institutional investors like OST run the risk of turning their backs on investment best practices and holding assets until they are worthless.

- The City of Portland, 2015[146]
- Multnomah County, 2015[147]
- City of Eugene, 2014[148]
- Metro, 2016[149]
- Portland Community College, 2017[150]
- Oregon Public University Fund, 2017[151]
- Lewis & Clark College, 2018[152]
- City of Milwaukie, 2021[153]
- Reed College, 2021[154]

Oregon Institutions Already Divesting

If the Oregon Treasury divests from fossil fuels, it will be far from the first institutional or governmental body in Oregon to take this crucial step. Many entities in Oregon have divested; indicated their intent to start the process; or, if the OST controls the funds, have called on the Oregon Short Term Fund Board, the Public Employee Retirement System (PERS), and the Oregon Investment Council to divest from fossil fuels.

The divestment movement extends far beyond Oregon's borders.[155] In the United States, countless high-profile institutional investors have divested including Harvard University, the University of California, The Church of England, New York City, New York State, and Maine. Grassroots activists around the country are organizing and joining the international movement.[156, 157] Oregon has a green economy, grounded in renewable energy, agriculture, and a historical commitment to protecting our natural spaces. Building on this legacy and leading the country forward requires bold leadership from every governmental agency including, critically, divestment by the Oregon State Treasury.

"What do you think a state like New York State doesn't understand that you do, or vice versa? If a much bigger state, with a much bigger pension fund, can make this plan to go in stages to divest from fossil fuel companies, I guess why can't Oregon?"

DAVE MILLER INTERVIEWING OREGON STATE TREASURER TOBIAS READ ON THINK OUT LOUD, *OPB, JUNE 3, 2021*[158]

Oregon has a green economy, grounded in renewable energy, agriculture, and a historical commitment to protecting our natural spaces. Building on this legacy and leading the country forward requires bold leadership from every governmental agency including, critically, divestment by the Oregon State Treasury.

"Climate change is a profound and persistent threat to Oregonians and a risk to institutional investors like Oregon State Treasury."

DMITRI PALMATEER, OST
IN 4/15/22 EMAIL TO DIVEST OREGON VOLUNTEERS

About Divest Oregon

Divest Oregon is a statewide coalition of individuals and 90 nonprofit organizations. PERS members, unions, racial and climate justice groups, youth leaders, and faith communities have joined forces to call the Oregon Treasury to account for its funding of climate chaos. We are part of a national movement that includes the Climate Safe Pensions Network and the Stop the Money Pipeline coalition. Learn more and join us at DivestOregon.org.

Appendices

Appendix A: Definitions

Alternatives fund: This is a term coined by Oregon State Treasury. It is investments that are considered non-traditional or emerging in nature, such as hedge funds, infrastructure investments, natural resource investments, diversified equities, and others. Specific infrastructure sector exposures will likely include energy, transportation, ports, and water.

Asset class: An asset class is a grouping of investments that have similar characteristics and are subject to the same laws and regulations. Typical asset classes are equity, fixed income, real estate, and cash.

Distressed debt investing: Distressed debt investing is the process of investing capital in the existing debt of a financially distressed company, government, or public entity. A financially distressed company is usually having difficulty paying its debt and may be facing bankruptcy.

Divestment: The process of selling off business interests or investments.

Equities: Equity investments represent ownership in a company and with it a proportional share of the company's profits or losses.

Fiduciary: A fiduciary is a person or organization that acts on behalf of another person or persons, putting their clients' interests ahead of their own, with a duty to preserve good faith and trust.

Fixed income fund: The money that flows in as the repayment of debt. The investor is essentially the lender, receiving loan payments in a series of interest payments and a single, final repayment of the principal.

General partner: In private equity funds, the general partner assumes a day-to-day role in managing it. A general partner has the authority to act on behalf of the business without the knowledge or permission of the other partners.

Limited partner: In private equity funds, the limited partner invests in the fund and has little to no control over the management of the entity, but their liability is limited to their investment.

Opportunity cost: Opportunity cost is the amount of potential gain an investor misses out on when they commit to one investment choice over another.

Opportunity fund: This is a term coined by the Oregon State Treasury. The fund invests in strategies that fall outside the boundaries of "strategic" or approved policy mix allocations including new or innovative strategies across a wide range of potential investment opportunities and with few limitations or constraints.

Oregon Investment Council (OIC): The Oregon Investment Council oversees the investment and allocation of all State of Oregon trust funds, including the Oregon Public Employees Retirement Fund, the Common School Fund, and the State Accident Insurance Fund. Council members are fiduciaries. Four members are appointed by the governor, and two are ex officio members: the State Treasurer, an elected official, and the director of the separate agency that administers the Public Employees Retirement System.

Oregon State Treasury (OST): The Oregon State Treasury operates the state's investing, banking, and debt programs.

Oregon Short Term Fund (OSTF): A fund includes all excess state agency cash and cash invested by local governments on a discretionary basis.

Public Employee Retirement Fund (PERF): The invested funds of the PERS system, invested under the oversight and direction of the Oregon Investment Council, with staff support from the Oregon Treasury.

Public Employee Retirement System (PERS): PERS administers the public employee benefit trusts, including the retirement system for public employees.

Private equity: Investments that are ownership shares in a company that are invested privately through a fund. The private equity shareholders are either limited partners, such as Oregon State Treasury, or general partners, such as KKR. The general partner is largely responsible for executing and operating the investment. Private equity's portfolio companies are not bought or sold on a public stock exchange, and prices are not set by market forces. Private equity investments are made for years at a time. The rights of private equity shareholders are negotiated on a case-by-case basis. State law mandates that the details of private equity holdings do not have to be disclosed in response to public records request.

Public equity: Investments that are ownership shares in a company, called stocks, that can be bought and sold on a public stock exchange. Stock prices are set by market forces and prices are publicly available. The market is regulated by the Securities Exchange Commission.

Real estate: Investments in land, buildings, or other real property.

Shareholder engagement: A process by which investors in public companies leverage their position as shareholders to influence corporate decision-making.

Stranded assets: Stranded assets are assets that have suffered from unanticipated or premature write-downs, devaluations, or conversion to liabilities. They can be caused by a range of environment-related risks.

Asset Class	Definitions[159]
Private Equity	**Investments that are ownership shares in a company that are invested privately through a fund. The private equity shareholders are either limited partners, such as Oregon State Treasury, or general partners, such as KKR. The general partner is largely responsible for executing and operating the investment. Private equity's portfolio companies are not bought or sold on a public stock exchange, and prices are not set by market forces. Private equity investments are made for years at a time. The rights of private equity shareholders are negotiated on a case-by-case basis. State law mandates that the details of private equity holdings do not have to be disclosed in response to public records request.**
Public Equity	**Ownership shares in a company, called stocks, that can be bought and sold on a public stock exchange. Stock prices are set by market forces and prices are publicly available. The market is regulated by the Securities Exchange Commission.**
Fixed Income	**The money that flows in as the repayment of debt. The investor is essentially the lender, receiving loan payments in series of interest payments and a single, final repayment of the principal. These assets include those classified as "corporate," which is the name given to fixed income instruments issued by private and public companies.**
Real Estate	**Investments in land, buildings, or other real property.**
Opportunity	**Asset class coined by the Oregon State Treasury, opportunity investments fall outside the boundaries of "strategic" or approved policy mix allocations and include new or innovative strategies across a wide range of investment opportunities and with few limitations or constraints.**
Alternatives	**Asset class coined by the Oregon State Treasury. Alternative investments are considered non-traditional or emerging in nature, such as hedge funds, infrastructure investments, natural resource investments, and diversified equities. Specific infrastructure sector exposures will likely include energy, transportation, ports, and water.**
Oregon Short Term Fund (OSTF)	**This fund includes all excess state agency cash and cash invested by local governments on a discretionary basis.**

Types of Fossil Fuel Holdings[160]

- **Production (Group 1):** Oil and gas producers and explorers, coal companies, and some diversified companies with large hydrocarbon reserves, especially those appearing on the Global Climate Exit List,[1]œ[1] representing 90% of the world's thermal coal production and the world's coal-fired capacity, or Carbon Underground 200 which is the top 100 coal and the top 100 oil and gas publicly-traded reserve holders globally, ranked by the potential carbon emissions content of their reported reserves.[1]œ[2] Vertically integrated oil/gas companies, meaning companies with oil/gas reserves as well as midstream or refining operations, are typically flagged as production.

- **Support (Group 2):** Oilfield services/equipment companies, refiners, pipeline and other midstream companies.

- **Utility (Group 3):** Fossil fuel power producers, electric and gas utilities. Utilities with an obvious focus on renewable energy production are not flagged.

- **More Fossil Fuels (Group 4):** Holdings in companies with obvious fossil fuel interests and actions not fitting easily into the first three groups. Holdings in fossil fuel energy private equity funds are assigned here.

- **Broad Market Funds (Group 5):** Holdings in broad market funds, including index funds, that would be forced to hold oil/coal/gas investments, generally to the same degree these companies appear in the underlying index. These funds such as banks and insurance companies were not included in the analysis of fossil fuel holdings.

Appendix B: Oregon State Treasury Fossil Fuel Investment Performance Analysis

Summary

Investing in fossil fuel companies carries significant financial risk, but quantifying that risk is difficult and uncertain. Predicting when fossil fuel investments will become stranded assets depends on forecasting years into the future. However, fossil fuel investments have already begun to underperform compared with whole-market indices,[163, 164] and if these trends continue, or accelerate, fossil fuel investments may prove not to be in the best financial interests of institutional investors. As of June 30, 2021, the Oregon State Treasury (OST) had over $5 billion dollars invested in fossil-fuel-related stocks and funds, and these funds support the retirement of over 380,000 members of the Public Employees Retirement System (PERS).

The performance of the OST's fossil fuel investments was evaluated between January 2012 and January 2022. The OST does not regularly disclose all of its investments, so this analysis approximates the historical performance of its fossil fuel investments by assuming that the inventory from June 30, 2021 was held continuously over this analysis period. The resulting historical value of fossil fuel holdings was compared against their value if they had instead been invested in a fossil fuel free index beginning in 2012. Two methods were used in an effort to reflect the uncertainty in estimating the underperformance by fossil fuel investments, but these estimates should not be considered upper or lower bounds. A lower estimation method considered a limited set of 200 specific fossil fuel holdings, while an upper estimation method included a broader set of three categories of fossil fuel related investments. These two methods yielded estimates of $4 billion and $10 billion over the past decade. The wide range reflects the exclusivity and inclusivity of the two methods. The large magnitude of both estimates suggests that the underperformance of fossil fuel investments should not be neglected when considering calls for divesting the Oregon Treasury from fossil fuels. These lost opportunities would have gone a long way to reduce the unfunded actuarial liability in PERS, reported by OST to be at nearly $20 billion as of December 2021.[165]

Methods

The OST is not required to regularly publish an inventory of its holdings, so it is not possible for the public (even PERS members) to directly evaluate the historical value of its fossil fuel holdings. However, the OST responded to a recent public records request by providing a list of its holdings and their market values as of June 30, 2021. As permitted under Oregon Statute, contents of private equity holding investments are shielded from disclosure and thus were unable to be analyzed for this report. The advocacy group that made the public records request, Divest Oregon, subsequently commissioned Third Rail Economy to analyze all the OST's reported holdings for exposure to fossil fuel companies and assets. Third Rail Economy categorized the holdings into discrete types of Fossil Fuel holdings (identified as Groups 1-5) indicating their relationship to fossil fuels as described in Appendix A. This comparison of investment performance considers the combined holdings in PERS and the Oregon Short Term Fund (ORSTF) together.

In order to evaluate the performance of the OST's investments in fossil fuels, portions of the June 2021 inventory were assumed to have been held continuously over the period beginning on January 31, 2012 through January 31, 2022. Their value was estimated using daily historical price data downloaded through the Yahoo! Finance Application Program Interface (API). The value of each holding was fixed on June 30, 2021 based on data from OST, and the value before and after changed proportionally with the price. Daily values were estimated using the adjusted closing price,[166] which accounts for stock splits and reinvestment of dividends, adhering to Center for Research in Security Prices (CRSP) standards.[167]

Two portions of the OST's June 30, 2021 fossil fuel holdings were modeled to estimate the number of stocks and total market value back to January 31, 2012. These portions were used to make comparisons of the performance that are referred to below as the lower and upper estimates:

1. Lower estimate: The largest 200 public equity holdings in Groups 1 through 4 with dividend and split-adjusted price data available over the analysis period were analyzed. Tickers were determined individually by searching for the closest match to the text description of each holding, if any suitable match existed. Each holding was modeled according to its history of adjusted closing price, and the results were summed to show the aggregate behavior of this group of holdings. Some holdings had data available from the Yahoo! Finance API for only a portion of the analysis period, and those without prices at the start, end, and on June 30, 2021 were omitted. Omitting them from the analysis introduces survivorship bias. However, the total value of these 57 omitted holdings in June 2021 was $0.2 billion, a minor component compared with the 200 holdings included that were worth $1.5 billion in June 2021.

2. Upper estimate: The total value of holdings in Groups 1 through 3 were modeled assuming that they behaved as the S&P 500 Energy Sector Index[1]œ(SPN). The assumption is that holdings in Groups 1 through 3 (Production, Support, and Utility) behaved most similarly to the energy sector. Group 4 holdings were excluded from this analysis due to lower confidence that their historical performance would be well represented by the energy sector index, especially due to lack of knowledge about the specific investments within private equity funds.

Both approaches used the same method to estimate the value of a fossil fuel free alternative. Once the historical price and dividend data had been used to estimate the number of stocks and total market value on January 31, 2012, that initial estimated value of fossil fuel stocks was then modeled as being invested instead in the S&P 500 Fossil Fuel Free Index[1]œ¤ (SP5F3UP). Data for that index were readily available beginning on January 31, 2012, which is why that date was chosen as the early limit of this analysis. Similar indices[170] and investment products[171] continue to appear and could be used in subsequent analysis. The S&P 500 Fossil Fuel Free index was used here because the price data were readily available. The S&P 500 Fossil Fuel Free Index consistently outperformed the S&P 500 index over the analysis period (Figure 8).

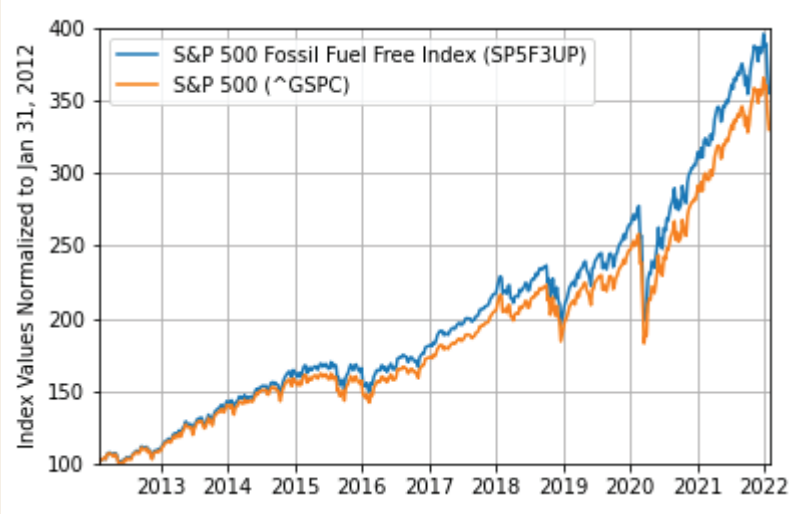


Figure 8: Comparison of S&P 500 Fossil Fuel Free Index against the S&P 500 overall. Values are plotted weekly to facili-tate comparison.

Note: Components of investment operations that were neglected in this analysis include costs of management, purchasing, and sale of stocks.

Results

Lower estimate

As described in the Methods section, the lower estimate was constructed by modeling the largest 200 individual holdings backward in time using adjusted price data available over the analysis period. The June 2021 value of all these 200 holdings together was $1.5 billion, and the estimated value rose by January 2022 to $1.6 billion (rounded to only 2 significant figures to reflect the precision appropriate to the method). Projecting back in time from the known value in 2021, the estimated January 2012 value was approximately $1.5 billion, as shown in Figure 9.

The historical performance was then evaluated by simulating reinvestment of the estimated 2012 total value in the S&P 500 Fossil Fuel Free Index. The modeled value of this alternate investment on January 31, 2022 was $5.4 billion suggesting that fossil fuel free investments would have outperformed the fossil fuel investments by $3.8 billion (Figure 9).

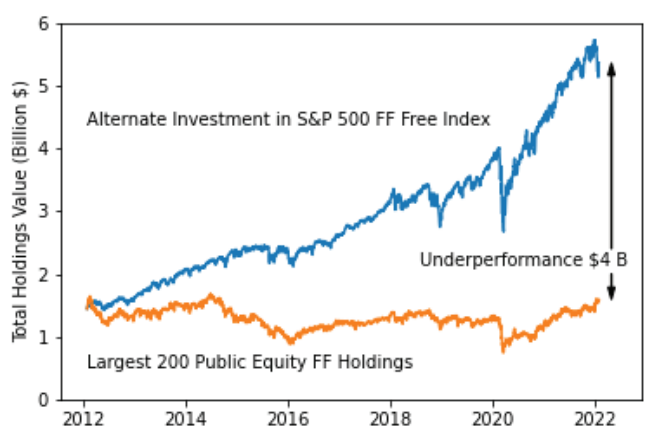


Figure 9: Time series supporting lower estimate of fossil fuel underperformance.
Lower line (orange): Total value of the largest 200 individual fossil fuel holdings with available data modeled backward in time from the June 2021 value.
Upper line (blue): Modeled reinvestment of the January 2012 estimated value in the S&P 500 Fossil Fuel Free Index.

Upper estimate

As described in the Methods section, the upper estimate was constructed by modeling the total value of holdings in Groups 1 through 3 backward in time using the S&P 500 Energy Sector Index. The June 30, 2021 value of the holdings in these groups was $2.7 billion. The estimated value on January 31, 2022 was $3.3 billion, and the estimated January 2012 value was $3.5 billion. Investing that initial estimated value in the S&P 500 Fossil Fuel Free Index would have yielded a value of $12.9 billion on January 31, 2022, which would have outperformed the fossil fuel investments by $9.6 billion (Figure 10).

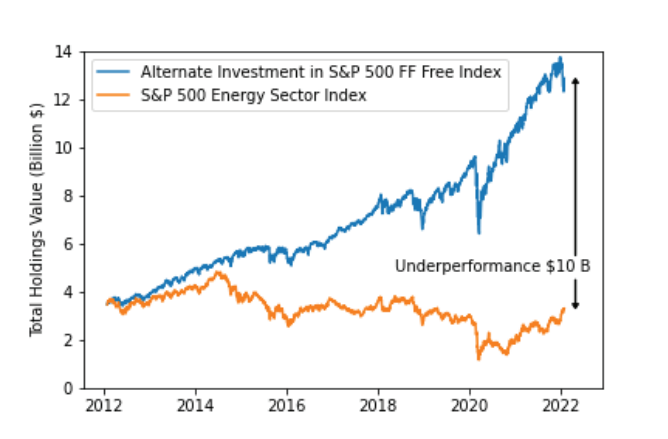


Figure 10: Time series supporting upper estimate of fossil fuel underperformance.
Lower line (orange): Total value of holdings in fossil fuel production, service, and utilities modeled backward in time from the June 2021 value using the S&P 500 Energy Sector Index.
Upper line (blue): Modeled reinvestment of the January 2012 estimated value in the S&P 500 Fossil Fuel Free Index.

Discussion

Two evaluations of the Oregon State Treasury's investments in fossil fuel stocks between January 2012 and January 2022 suggest that they underperformed compared with a fossil fuel free alternative. A method with more limited scope and higher precision found underperformance by $4 billion, while a method with broader scope and lower precision found $10 billion of underperformance. Both estimates assumed that fossil fuel holdings were held continuously over the analysis period with dividends reinvested, and they both modeled investment of the estimated 2012 value of the assets into the S&P 500 Fossil Fuel Free Index as an alternative to fossil fuel investment. The actual historical content of these investments may have varied due to active management, but without regular disclosure of the OST's holdings, the best assumption available to the public is to assume that investments were held continuously.

The lower of these two estimates considered only a limited subset of publicly traded holdings disclosed for June 2021. These were the largest 200 holdings with readily-discernible tickers and historical price and dividends data available over the analysis period. These holdings represent only public equity holdings, while all other asset classes (see Appendix A) are not represented. Together, these were only 200 holdings of the 807 categorized fossil fuel holdings and representing less than 28% of the total June 2021 value of fossil fuel holdings (about $1.5 billion of at least $5.3 billion). The fact that holdings existed at all in 2021 reflects survivorship bias in this analysis, where some fossil fuel investments held in 2012 may have performed even worse and been dropped. Considering the general underperformance of the energy sector compared with the S&P 500 and its fossil fuel free index over the analysis period, the survivorship bias and limitations on the size of this subset almost certainly caused this method to underestimate the additional money that could have been made by investing free of fossil fuels.

The upper of these estimates considered three broad categories of fossil fuel production, support, and utility (worth roughly $2.7 billion in June 2021) and assumed that they behaved similarly to the S&P 500 Energy Sector Index. While there is significant uncertainty about how well the S&P 500 Energy Sector Index can be used to model the historical behavior of these investment categories, it serves as a more plausible analog than broad indices of the stock market as a whole. The uncertainty also suggests that historical performance of the OST fossil fuel holdings could have been worse than estimated with this more inclusive method, such that it is referred to as an upper estimate and not an upper bound. Increased transparency from the OST about historical investments would enable better refined evaluations of their performance.

The underperformance of the OST's fossil fuel investments is most likely larger than that presented here because private equity holdings were not evaluated. The specific investments in these funds are unavailable via public records request because of state laws prohibiting their release. Thus, the performance of their fossil fuel components cannot be evaluated by the public.

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